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EDITORIAL

MAKE A GOOD RESOLUTION.

New Year's is the time for good resolutions. One of the best the physicians of this State can make is to do their duty regard- vital statistics. Notwithstanding the efforts of the State Board of Health, of the New Orleans Board of Health, and some other local boards, many are derelict in reporting births and fail to try to interest their local authorities in providing for the proper registration of these as well as of deaths.

The advisability of having this State included in the registration area of the United States and the many other advantages to accrue when it can make a decent showing regarding the col-

lection of our vital statistics have been so often and so convincingly brought out that we need waste no space to repeat them. We deem it timely to urge our readers not only to do better than before in this respect, but to stimulate all others to do likewise, and we hope our reminder will produce the desired effect.

THE LIBRARY FUND BENEFIT.

The Orleans Parish Medical Society has taken a new and radical departure in announcing a concert and dance which it is to give for the benefit of its library fund on January 27 at the Atheneum.

Whatever may have been the arguments advanced against the policy of an appeal in that form, and some were no doubt of merit, the matter is now settled, the majority evidently considering the reasons in favor to have preponderating force. Therefore it only remains for the members to work heartily for the success of the entertainment, which we believe is now practically assured. As we are going to have the benefit, let us make it a fine one. The need is great or the Society would not have undertaken the enterprise, but over and above this we cannot afford to obtain only a meager success—it must be a profound one.

Not only should all the members of the Society work enthusiastically, but the members of the profession throughout the State should lend a helping hand. The general public, only to be reached indirectly through the physicians, will no doubt be sympathetic and assist accordingly.

The Orleans Parish Society has never asked for assistance before and we hope never will again, but all should respond nobly on this unique occasion.

THE NEWMAN CHARITY.

Within one week in December Mrs. Isidore Newman and Mrs. Henry Newman were placed among the benefactors of the New Orleans poor through the announcement of gifts to Touro Infirmary, according to press reports, totaling $200,000.

The objects of these gifts are stated as providing for clinic

buildings and for the establishment of an adequate maternity service at the Touro Infirmary.

For a long time the attendance at the Touro clinics has entirely exceeded the capacity for the care of the poor seeking such service, and the gift of Mrs. Isidore Newman's children in honor of her birthday anniversary is both timely and far-reaching. The prompt second gift from Mrs. Henry Newman, her sister-in-law, shows a spirit of philanthropy which has been attached to the many members of the Jewish faith who have brought the Touro Infirmary up to its present efficiency.

Indirectly the medical profession benefits by such public spirit through the provisions made for the poor in an eleemosynary institution with a large population among the poor from which to draw.

May many more New Orleans citizens emulate such glorious examples of public spirit and broad charity.

ANNIVERSARY OF THE MULFORD CO.

In a special number of the *Mulford Digest*, the H. K. Mulford Company commemorates its twenty-fifth anniversary. The number is of unusual interest, containing contributions by well-known scientific men on their work with vaccines, serums, mixed bacterins, and the testicular method for preparing smallpox vaccine. Much of the original work reported was done by the scientific staff of the Mulford Company and illustrates the service the Mulford Laboratories are rendering the profession. The company is to be congratulated in the work it has undertaken and accomplished.

ORIGINAL ARTICLES

(No paper published or to be published in any other medical journal will be accepted for this department. All papers must be in the hands of the Editors on the tenth day of the month preceding that in which they are expected to appear. Reprints may be had at reasonable rates if a WRITTEN order for the same accompany the paper.)

INCONTINENCE OF URINE IN WOMEN.*

By MAURICE J. GELPI, A. B., M. D.
Assistant Professor of Gynecology, Tulane University, Visiting Gynecologist, New Orleans Charity Hospital.

I wish to call your attention to a few important points in connection with the diagnosis, pathology and treatment of a certain type of urinary incontinence occurring in women. I refer especially to the type of incontinence associated with prolapse of the anterior vaginal septum.

This condition is usually found in multiparæ, though occasionally it is encountered in nulliparæ who are either very stout or very thin. These patients complain that they cannot retain their urine. They state definitely that when they cough or strain, the urine runs out of the bladder in spite of any efforts to prevent it. As a result of the urinary dribbling, which occurs on the least exertion, these women are kept in a state of constant distress. The diagnosis is readily established by the history and physical examination, and the latter will also reveal the true pathology.

Pathology.

With the patient in the dorsal position, if requested to cough, the urine will be seen to either squirt or ooze out of the urinary meatus. This is usually accompanied by an easily discernible bulging and rolling outward of the entire vaginal wall, not necessarily associated, however, with descent of the uterus. As a matter of fact, the cases of uterine prolapse or simple cystocele, not only have no incontinence, but usually have at least a tendency to a certain degree of retention. If the finger is inserted in the vagina, in such a way as to support the anterior vaginal wall without undue compression of the urethra, it will be found that even if the patient strains quite forcibly in the act of coughing, the dribbling will no longer occur. If, to follow further the suggestion of Muret, a catheter is inserted in the urethra, it will be possible to show clearly the typical urethral deformity found in these cases. On first inserting the catheter, it will proceed more or less directly backward in a plane parallel

*Read at the Clinical Meeting of the Louisiana State Medical Society, April, 1916.

with the table. If an attempt is made to follow with the tip of the catheter the anterior urethral wall, the catheter will be found to proceed directly backward into the bladder, very much in the same plane that it occupied on entering the urethra. If, on the other hand, an attempt is made in the same way to follow the posterior urethral wall, the catheter will proceed directly

Fig. I.—Simple cystocele, showing prolapse of bladder wall, but urethral walls parallel. No incontinence. (Reproduced by permission of the author, from "Incontinence d'Urine et Prolapsus Vaginal." Prof. M. Muret. **Revue de Gynecologie,** April-May, 1913.)

Fig. II.—Cystocele with uterine prolapse. The sagging of the bladder wall is accompanied by descent of the uterus, but the urethral walls remain parallel throughout their course. No incontinence. (Reproduced by permission of the author, from "Incontinence d'Urine et Prolapsus Vaginal," Prof. M. Muret, **Revue de Gynecologie,** April-May, 1913).

backward for a distance of a half-inch or so and thereafter, in order to make the tip continue to impinge on the posterior urethral wall throughout its course, it will be necessary to elevate the outer end of the catheter so as to bring it at an angle of about forty-five degrees with the plane of the table. This procedure definitely proves the existence of the typical funnel-shape deformity of the urethra, which is characteristic of the type of incontinence in question (Figs. I, II and III). It will be seen, therefore, that the pathology is not restricted to the urethro-vesical sphincter alone, but that the sphincter relaxation is accompanied by a definite sagging of the posterior urethral wall, a funnel-shape dilatation of the urethra, plus also a definite relaxation of the whole anterior vaginal wall, including vaginal mucosa, submucous connective tissue and portions of the pelvic fascia. In such a condition, therefore, the only point of obstruction to the intravesical pressure is found in the anterior one-half or three-quarter-inch of parallel urethral walls (Fig. III).

In discussing the characteristic sagging of the posterior urethral wall, the question naturally arises as to why it is that

both the urethral walls do not sag to the same degree, leaving both walls parallel though occupying a lower plane. The answer is that, automatically, the only support of the posterior urethral wall consists of the structures composing the anterior vaginal septum, enumerated above. On the other hand, in the case of the anterior urethral wall, an additional support is found, in the form of strong fibrous bands extending from in front, below and behind the pubes, to the anterior urethral wall. (Fig. III.) This furnishes an additional support to the anterior urethral wall from above. The support thus afforded is sufficiently strong to hold up the anterior urethral wall even in the absence of support from the anterior vaginal septum below. This point is clearly brought out by Muret, who thus explains the funnel-shape urethral dilatation illustrated in Fig. III.

Fig. III.—Prolapse of anterior vaginal septum, with incontinence. Note normal position of anterior urethral wall and its firm attachment to pubes. Note also sagging of posterior urethral wall producing the typical funnel-shape deformity. The only part of the urethral walls lying parallel to each other, is found anteriorly, just back of the meatus. (Reproduced by permission of the author, from "Incontinence d'Urine et Prolapsus Vaginal," Prof. M. Muret, **Revue de Gynecologie,** April-May, 1913).

Treatment.

The treatment naturally divides itself into the palliative and radical. In determining which course is to be pursued in the individual case, several points come up for consideration. However, the desire of the patient as regards operation, the age and physical condition often settle the question. Where for some good reason the palliative treatment is considered the proper course, the fitting of one of the old Skene pessaries will be found to fulfill the pathological requirements and to give excellent clinical results (Figs. IV and V). The same objections of course will be found here as in the use of all pessaries and the relief will only be obtained during the period that the pessary is actually in use. Where there is no contraindication therefor, the radical operation is the ideal treatment.

It should be noted, however, that since the first attempt at operative cure, the surgical treatment has undergone considerable evolution. No attempt can be made here to review all of

the numerous surgical procedures which have been advocated for the cure of incontinence. Reference can only be made to a few of the most practical suggestions appearing in comparatively recent years.

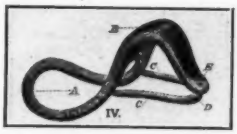


Fig. IV.—Showing the details of Skene's pessary used in the treatment of incontinence of urine, in inoperable cases. (Reproduced by permission of the publishers, from "Treatise on the Diseases of Women," Skene, D. Appleton & Co., N. Y.).

The use of electricity and paraurethral injections of paraffin were early tried and abandoned.

Gersuny suggested and practiced exposure of the urethra and torsion. The urethra was dissected from its bed and twisted upon itself. In this twisted position, the urethra was replaced and held in its bed by sutures. While very ingenious, the objections to the method are obvious.

Pawlik attempted to overcome intravesical pressure by elevating the posterior urethral wall and compressing the urethra. The urethral compression depended upon lateral tension on the vaginal mucous membrane. He accomplished this by means of a mucous membrane denudation on either side of the urethra, followed by suture of the denuded areas in a line parallel to the long axis of the urethra. While an improvement over the torsion of Gersuny, this method also failed to fulfill all the requirements.

Fig. V.—Showing Skene-pessary in place. It affords a firm support to the sagging anterior vaginal septum and the typical funnel-shape deformity of the urethra is effectively corrected. (Reproduced by permission of the publishers, from "Treatise on the Diseases of Women," Skene, D. Appleton & Co., N. Y.).

With attention still directed principally to the urethra, Albarran devised the operation for advancement of the urethra, in which the urethra was dissected free and the meatus sutured just below the clitoris. Two flaps of vaginal mucous membrane held the urethra in its new position.

Working along the same general lines, Dudley devised the horse-shoe denudation with the convexity surrounding the meatus. The urethra itself was not dissected from its bed. The method comprises essentially the bilateral denudation plus the urethral advancement. Though dependent for success on anatomical dis-

tortion, the operation has produced excellent clinical results. The details of technic are clearly shown in Fig. VI.

Kelly considers that the essential element at fault is the relaxation of the urethro-vesical junction. Attention is directed by him, therefore, solely to this area. A denudation exposing the area is accomplished and the relaxation in the region of and including the vesical sphincter is puckered by means of linen or silk U sutures. Technical details are shown in the accompanying cuts (Figs. VII and VIII). The operation according to the author is productive of very good results.

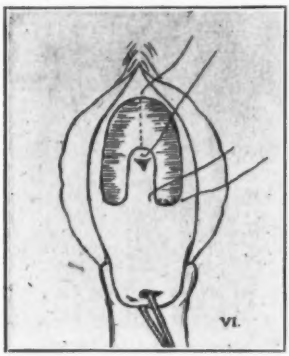


Fig. VI.—Diagrammatic sketch of Dudley's operation, showing horseshoe denudation and method of suture. (Author's original sketches illustrating details of technic not reproduced, on account of objection on the part of the publishers).

Baldy reports successful results from his method, which is fundamentally the same as Kelly's. He lays stress on the importance of compression at the urethro-vesical junction. This is accomplished by bringing together the edges of a denuded oval, under considerable tension. So as to release this tension on the suture line during healing, a single relaxation suture is inserted so as to overlap the original suture line (Figs IX and X).

Fig. VII.—Showing denudation as practiced by Kelly. A pezzer catheter is used to bring into prominence the urethro-vesical junction. (Reproduced by permission, from "Urinary Incontinence in Women, Without Manifest Injury to the Bladder," Kelly & Dumm, **Surg. Gyn. & Obstet.**, April, 1914).

The procedure which in our hands has seemed to fulfill best the pathological indications and produce the best results, is that suggested by Muret. In this technic, special attention is directed to two points, —the correction of the most prominent point of relaxation at the urethro-vesical neck, and the anatomical restoration as far as possible, of the supporting anterior vaginal septum. As the relaxation of the anterior vaginal septum occurs as a result of sagging from every direction,

special attempt is made to restore it to a higher plane, by tension from behind, in front as well as on both sides.

A wide oval denudation of the anterior vaginal wall is first made. The upper and lower limits of the oval extend respectively from below the meatus to a point on a level with the internal os (Fig. XI). The next step is to constrict the urethro-vesical neck. This is accomplished by means of silk or linen sutures, inserted in the bladder wall but not including the mucosa. These may be placed in the form of interrupted U sutures as practiced by Kelly and Dumm, or in the form of a single purse string, which effectively reduced the bladder and urethral herniation. So as to secure for the bladder a firm support from below, the edges of the denuded area are sutured so as to take in the slack on on either side, in front, and behind. The middle one-third of the suture line is thus made parallel to the long axis of the vagina, while in front and behind, the free edges are brought together parallel to each other and at right angles to the original line of sutures. The entire suture line when finished is thus made to assume the outline of a capital I (Fig. XII). The stitches are interrupted, of chromic gut and are inserted so as to make each bite include, not only vaginal mucosa but whatever scar, connective tissue and fascia fibres can be caught up by the needle point. The sutures may be safely tied under considerable tension, though

Fig. VIII.—Showing method of constricting urethro-vesical neck, in the Kelly technic. (Reproduced by permission from "Incontinence of Urine in Women Without Manifest Injury to the Bladder," Kelly & Dumm, **Surg. Gyn. & Obstet.**, April, 1914.)

Fig. IX.—Showing the denudation in the anterior vaginal wall and method of suture, according to Baldy. (Reproduced by permission from "Incontinence of Urine, Complete and Incomplete," J. M. Baldy, **Surg. Gyn. & Obstet.**, Nov., 1913).

Fig. X.—Baldy operation completed. Showing the relaxation suture to relieve tension on the main suture line. (Reproduced by permission from "Incontinence of Urine, Complete and Incomplete," J. M. Baldy, **Surg. Gyn. & Obstet.**, Nov., 1913).

this of course must not be overdone.

When in addition to the pathology of incontinence there is present other pathology like retroversion or relaxed vaginal outlet, in order to avoid recurrence it will be necessary to extend the operative correction to these conditions also.

Fig XI.—Showing the extensive oval denudation as suggested by Muret. (Reproduced by permission of the author, from "Incontinence d'Urine et Prolapsus Vaginal," Prof. M. Muret, **Revue de Gynecologie,** April-May, 1913).

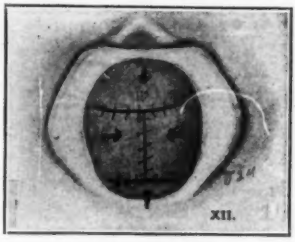


Fig. XII.—Showing the appearance of the suture line in the Muret technic and the direction of the shortening produced. (Modified from "Incontinence d'Urine et Prolapsus Vaginal," Prof. M. Muret, **Revue de Gynecologie,** April-May, 1913).

In conclusion it might be stated that the method of treatment advocated here commended itself to us because of is technical simplicity, its fulfilment of anatomical and pathological requirements, and most of all, because it yielded in our hands the most gratifying clinical results.

LARGE TYPHOID ABSCESS. CASE REPORT.

By J. MAXIME PERRET, M. D.,
Resident Physician, Hotel Dieu, New Orleans.

Typhoid fever is notorious for its numerous complications and sequelæ. On this account, it is always an interesting disease to watch.

The typhoid bacillus is not usually a pyogenic organism. However, abscesses may be caused by it in any tissue or organ of the body. At times it may be the sole cause of the abscess; at other times it occurs in conjunction with the common pus organisms. Large typhoid abscesses are rather rare.

Furunculosis and boils are not uncommon in typhoid, usually occurring toward the end of the disease. These seem to be due to the ordinary pus-producing germs. This is not surprising,

as the disease offers favorable conditions for their development, e. g., lowering of the general body resistance, long confinement to bed, difficulty in keeping patient clean, etc. Incidentally I may say that I have seen furunculosis, occuring during the course of typhoid, disappear as if by magic after the administration of diluted nitro-hydrochloric acid. When an abscess develops in an extremity, months or years after the patient has recovered from typhoid, a periosteal or bone involvement should not be lost sight of.

In the present case, the skiagraph showed a periostitis and slight rarefaction of the bone about the size of a pea. The longevity of the typhoid bacillus in the human body is remarkable, thus the germ has been recovered in pure culture from the gall bladder thirty years after an attack of typhoid; osteomyelitis has developed after five years; in my case it was only after a comparatively short time, six months.

History of the Case.

J. M. R., white, married male, twenty-six years, native of Louisiana, clerk in a shoe store, was admitted to ward 66 of the Charity Hospital on the 5th of June, 1916, complaining of pain and swelling of back of right thigh.

Family History.—Mother had typhoid at age of fifteen years. Otherwise, nothing of interest.

Previous History.—Measles and pertussis in infancy. Mumps in childhood. With these exceptions, he had always enjoyed perfect health up to the beginning of November, 1915, when he contracted typhoid fever, which kept him in bed for six weeks. The disease ran an uneventful course. A week after getting up he returned to work. As he was then engaged in taking the stock, this necessitated the frequent climbing of a ladder. A few days after his return to work, the lower two-thirds of the front of his right thigh began to pain him. He had a slight afternoon elevation of temperature. At the end of a month he consulted a physician, who advised him to remain in bed, which he did for three weeks. During this time the temperature was higher than previously and he would have chills every other day. He was given some medicine in capsules, which promptly relieved the chills.

About February 10, 1916, he noticed a red, painful streak, about one and one-half inches wide, occupying

the middle of the lower half of the anterior surface of the right thigh. There was persistent pain along both sides of right tibia. Associated with this was a slight fever. After a week of suffering, he applied at the Charity Hospital and was admitted to ward 19. A physical examination at that time revealed a localized hard, painful swelling of the anterior surface of the right thigh. The blood picture showed a total leucocytic of 19,444 per c.m.m. The urine had many hyaline and granular casts. For twelve days his temperature was in the neighborhood of 101° F. A diagnosis of post typhoid phlebitis was made. The treatment consisted of supporting the leg on pillows. After a month, he was well enough to be discharged.

A week after returning home he resumed work. He did not remain well long, for at the end of eight days the posterior aspect of the right thigh near knee joint became painful and felt as hard as a board; in two days the hardness had spread to junction of middle and upper thirds of thigh. He was free from fever. He consulted a physician, who prescribed counterirritants and ointments. Medication relieved patient and in a week he was feeling well enough to return to work.

Present Illness.—On June 5, 1916, patient applied for readmission. The hardness and pain with which he had suffered about a month previously returned. His condition was steadily getting worse. He was now having fever. The attending physician made a diagnosis of abscess and advised him to go to the hospital for surgical treatment.

Physical Examination.—Physical examination showed a well-developed and nourished young adult, white male. Patient lies on back with right leg flexed at knee. Lymphatic glands not palpable. Chest: Heart and lungs negative. Abdomen: Negative. Extremities: Lower half of right thigh, posteriorly, is symmetrically enlarged. The skin is red, hot, quite tense, very painful and deep fluctuation may be detected.

June 8, 1916: Under ½% Novocain anesthesia, Dr. F. W. Parham made two incisions over the fluctuating mass. Eight ounces of pus were obtained. There was nothing remarkable in the physical characteristics of the pus. It was white and thick. Rubber tube drains were left in the wound. A specimen of the pus was sent to the Pathological Laboratory with a special request of Dr. W. P. Bradburn to look for *B. typhosus*. A few days

later the laboratory reported that *B. typhosus* had been isolated in pure culture.

June 13, 1916: Widal positive. Blood culture negative.

Post Operative Course.—Temperature dropped down to normal after operation. The wound would not heal, and convalescence was tedious. Six weeks later a secondary operation was performed; a free incision was made and the bone curetted. After a few weeks, patient was discharged cured. However, as there might still be some bacilli lying dormant in the nearby tissues, it is a little early to be sure of the ultimate results.

Review and Discussion of Case

The rarity of large, pure typhoidal abscesses makes the case interesting. From a perusal of the patient's history, it will readily be seen that up to the time of his readmission to the hospital he always had typhoid germs in his tissues. The patient's occupation, necessitating his climbing a ladder, made his thigh become a locus minoris resistentiae, which the bacilli then attacked. There is no history of conscious trauma.

The diagnosis of phlebitis made on his first admission seems to me to be open to doubt. I am inclined to think that all along the condition was periostitis with secondary involvement of the soft parts. Rest would cause a temporary improvement, but as the cause of the trouble would not be removed he soon afterward would have a relapse. His first operation, which gave vent to the pus, was only temporary in its good effects, because it was not quite radical enough. The second operation, which attacked the necrotic bone, promises more permanent results.

Finally, my thanks are due to Dr. F. W. Parham, who gave me the privilege of reporting this case, which was in his service, on its second admission to the Charity Hospital, New Orleans.

A TUBO-UTERINE RUPTURE AT THE FOURTH MONTH OF GESTATION.*

By P. MICHINARD, M. D., New Orleans.

This case is reported because:

1. The afflicted tube was intentionally left when its companion was removed.

2. The diagnosis of ectopic was made six weeks before rupture.

4. The operation performed practically without general anesthesia.

5. A short space of time within which the operation was completed.

6. The uterus amputated instead of sewing the rent.

> *Case.*—Mrs. A. S., 25 years, white, never pregnant, was operated on by me at the Charity Hospital, September, 1915, for left hydrosalpinx and left cystic ovary, both being removed, as well as the appendix, as a routine procedure, but with her consent. The right tube was not removed because a careful examination failed to discover any apparent abnormality. She left the hospital October 24, 1915, apparently well.

She called at my office in the latter part of May, 1916, informing me that she was three weeks overdue in her menstrual appearance. She then had all the subjective symptoms of pregnancy, such as morning nausea, drowsiness and tingling at the breasts. The only unusual symptom she had was intermittent pain in the right iliac fossa.

Vaginal examination discovered a soft cervix, enlarged and boggy, but not fluctuating, uterine body. The only unusual condition was in the shape of the body, which was not round but somewhat projecting at the right horn, resembling a uterus bicornis. I knew there was no such uterus, because I would have noticed it in 1915, and certainly not have forgotten it. It was about the size of a large orange, while the projecting mass was somewhat smaller and formed part of the body. This projecting mass lacked the resistance of a fibroid and the elasticity of a cyst. Was it a pus tube? It had the feel of a pus tube. Let me say here that often a case has been operated on as one of tubal

*Read before the Orleans Parish Medical Society, October 23, 1916. [Received for Publication November 21, 1916.—**Eds.**]

gestation which proved to be a pus tube. But this mass was not immovable and there had not been nor was there fever, conditions that should be expected in pyosalpinx. Therefore, this could be excluded. The mass was not located at the usual site of an ovarian cyst, yet a few weeks ago I removed a small ovarian tumor that had wandered to the summit of the uterus and there developed a short pedicle. But this mass was not cystic in feel, only semi-fluctuating. Ovarian cyst could be excluded. All the signs and symptoms indicated pregnancy, but as the body of the uterus was only boggy and not fluctuating, as could be expected in a uterus containing a small ovum, the only conclusion to be arrived at was that there was either a tubal pregnancy in a uterus bi-cornis or in a rudimentary horn.

If a tubal pregnancy, it could be only at the uterine end of the isthmus, because if at any other part of the tube the mass would be felt some distance from the uterine body. It might be a pregnancy in a uterus bi-cornis or in a rudimentary horn. To differentiate between these and a tubal pregnancy involving a small part of the cornu, is impossible. As I knew there was no uterus bi-cornis a diagnosis was made of interstitial pregnancy, with probably a part of the cornu involved, and immediate operation advised. But when, after the patient's interrogations, I hinted that exceptionally in this form of tubal pregnancy the ovum escaped into the uterine cavity and from there made its exit, she decided to delay the operation.

Had I diagnosed pregnancy in a rudimentary horn I would also have advised operation, because here, unlike gestation in a fully developed horn of a uterus bi-cornis, where delivery at term has ended favorably, there would be no avenue of escape for the ovum, which, even if it did not rupture through the wall of the horn before the thirty-second week (of which cases are on record), would have required a Cesarean section near this period. I mention all of this because people with strong religious scruples demand information as to all possibilities that might avoid the destruction of fetal life. And it was this strong religious scruple that influenced my patient in her decision.

She was then advised of the danger of rupture, all signs and indications of which were explained to her, with the advice not

to delay when the first indication presented itself, but to send to me or to the Charity Hospital for assistance.

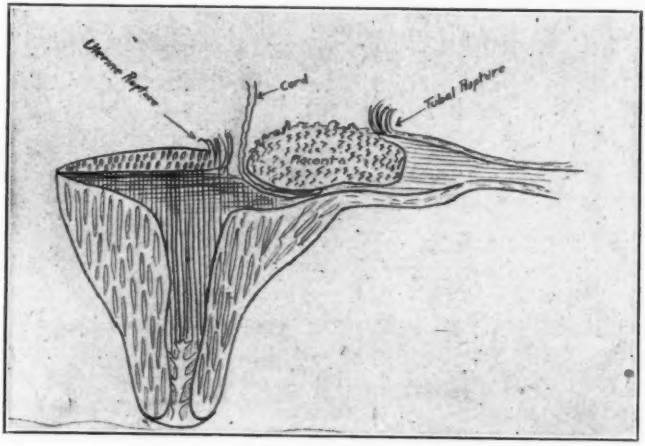
She was not heard from again until July 8, about six weeks after her visit, at 7:30 a. m., when I was called to her bedside. At 8:30 I saw her, when I was told that at 5:30 that morning, while preparing her husband's breakfast, she was seized with sharp abdominal pains and faintness. These soon diminished, but in an hour recurred with greater severity. When I saw her she was pretty well collapsed. Fearing to increase the bleeding I refrained from making any vaginal examination, but at once sent for the Charity Hospital ambulance.

Through the courtesy of the superintendent, Dr. Wilkins, she was assigned to my service. When she arrived at the hospital, at about 10, she was at once sent to the operating room. Again there was a delay for the arrival of the priest. The operation was begun at 10:45, the woman now being badly collapsed, so much so, that with only the analgesia produced by one-fourth of a grain of morphin and 1-150 of atropin, by needle, the abdomen was opened and the ruptured uterus and tube grasped and drawn through the wound. This was done in less than two minutes. With the bleeding under control, blood clots, which filled the pelvic and part of the abdominal cavities, were quickly removed to permit the rapid application of clamps. At this time, when all danger of further bleeding had passed, I had one and a half pints of normal salt solution given intravenously. Through the stimulation of the infusion the brain began to be receptive of pain, when a few inhalations of ether were given. A supra-vaginal amputation of the uterus was made. The operation was completed, the patient on her way to her bed, in less than thirty minutes. I was assisted by my regular assistants, Drs. Groetsch and Gomila. Recovery was complete.

The rent was about three inches long, two inches of which were at the fundus of the uterus, the other at the uterine end of the tube, which was dilated and shaped like the bell of a funnel. The fetus (three months) was in the abdominal cavity, the rent being filled by the placenta.

There are a few points of interest in this case. The first is that no anesthetic other than morphin was given until the brain had been stimulated. I believe many people die who are oper-

ated on during shock, not from the operation itself or reason for the operation, but from the added shock of the general anesthetic administered. These bleeding people are too depressed to feel pain. Morphin, and not ether, etc., is indicated at least for the first hemostatic steps of the operation, with novocain in abdominal wall. Here let me call attention to the remarks of George W. Crile, in his article on Alkalescence, Acidity and Anesthesia, which appeared in the June, 1915, number of *Surgery, Gynecology and Obstetrics*:



Dr. Michinard's case of Tubo-uterine Rupture

> "As a result of these researches we are able to state that the H-ion concentration of the blood, its acidity, is increased by excessive muscular activity; excessive emotional excitation; surgical shock;....by asphyxia, by inhalation of anesthetics....Morphin and scopolamin do not cause change in the H-ion concentration. Ether, nitrous oxide and alcohol produce an increased acidity of the blood, which is apparently proportional to the depth of anesthesia. Many cases studied were near death, as would be expected, since it is well known that a certain degree of acidity is incompatible with life. At the point of death the blood is always acid....In deep contrast to the action of inhalation anesthetics is that of narcotics."

Second, no infusion was used until bleeding had been controlled. The uterus was amputated because this may be done in

much less time than removing a tube and sewing a jagged rent in the uterus; and, anyway, a healing of such sewing is doubtful. At the risk of imperfect healing only a useless organ would have been retained. Third, there was a certain amount of bright liquid blood in the abdominal cavity, showing that bleeding had recurred after leaving home. This blood, in addition to one pint of normal salt solution, was left in the cavity. Fourth, the time elapsing from the occurrence of the rupture to the moment of operation was only five hours, and the distance traveled only about one thousand yards. Would she have been less shocked had she received morphin at the time of my visit (which I had not with me) and had we waited longer before operating? Judging from the bright liquid blood present active bleeding had recommenced, possibly due to the moving. Consequently, I believe the operation was timely.

It is astonishing how some of these cases behave. At 7 p. m. in May, 1904, with Dr. Hamilton P. Jones of this city, I saw in Mandeville, a summer resort about fifty miles by rail from New Orleans, a case that he had diagnosed as ruptured tubal gestation at the twelfth week. The history indicated that the rupture occurred at 1 p. m., or six hours before my visit. The patient had by this time greatly recovered from the shock attending the rupture. It was not until 9 o'clock that a special train could be equipped to take us to New Orleans, where we arrived about one the following morning. The lady was carried a distance of two hundred yards on a lounge to the baggage car, in which she, on the lounge, was placed, to begin an exceedingly rough trip. On our arrival she was transported to the New Orleans Sanitarium in an ambulance, where she arrived less shocked than when she left Mandeville, at which place, before our departure, she was given morphin and atropin by needle. So good was her condition that I decided to wait until 8 o'clock before operating. At the operation a large rent was found in the ampulla of the left Fallopian tube, which rent was filled by a firm blood clot. The abdominal cavity contained a three months' fetus, a fairly large quantity of large old blood clots with a very small amount of fresh blood, which was probably caused to flow by the preparation of the abdominal wall—at that date by scrubbing, etc.

Here was a case of large rupture, occurring nineteen hours before operation, suffering several hours of rough traveling, which practically recovers from the initial shock with only the slightest bleeding recurring. I mention this case because it contrasts so strongly with the other. Why the difference? Was the coagulability of the blood of one greater than that of the other? Was there an inherent power of recuperation greater in one than in the other? If the answer to both these questions be in the affirmative, is it possible for the surgeon to know it before operating? Several years ago I operated on a woman five hours after a rupture of a six months' tubal gestation; yet before the operation she discussed her case very freely with me. With these two latter cases in mind may we always wait any considerable length of time before operating? From my experience with this condition, seeing some cases become weaker and weaker hour by hour, I believe the sooner we operate the better. In desperate cases, where sterilized material can be quickly obtained, I see no objection to operating at home. I have done three ovariotomies and two abominal hysterectomies at homes. Operating at homes avoids the shock and disturbance of transportation. Naturally, home operation is a *dernier ressort.*

As to the preservative nonremoval of the left tube at the first operation: Was that tube as normal as it appeared to be? If so, why was the impregnated ovum arrested in its course at the entrance of the uterine cavity; or was the obstruction not in the tube but at its uterine aperture—this being sufficiently large to admit the entrance of a spermatozoa but too small (from some slight endometritis) to admit of the passage of the fecundated ovule? The tube certainly appeared normal to me. Unilateral salpingitis is rare. But on three different occasions I have removed a ruptured tube, the women later having uncomplicated uterine pregnancies. The gross appearance of a tube may indicate a healthy state, a slight thickening alone being in the intima. Anyway, we know little as to the etiology of tubal gestation.

PROCEEDINGS OF THE AMERICAN SOCIETY OF TROPICAL MEDICINE.

BACTERIAL CULTURES OF HUMAN SPLEENS REMOVED BY SURGICAL OPERATION.*

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In recent years, considerable evidence has accumulated which proves that bacteria can be cultivated from the unexposed tissues of the body, especially the lymphatic glands of normal men and the usual laboratory animals. In contrast to these findings, it was formerly assumed that the unexposed tissues of the body are sterile. Absolute freedom of the internal viscera from bacteria would constitute a rather remarkable relationship to our bacterial environment. When we consider the intimate contact of bacteria with skin and more especially the mucous membrane of the alimentary tract, it would be rather unexpected that these structures should form an absolute barrier against the entrance of bacteria. Consequently, it is not surprising to find a fairly definite flora present in the interior of the body under normal conditions. The relative ease with which bacteria may be cultivated from normal tissues naturally becomes very significant in the search for the etiologic agent of an infectious disease, especially when we consider how many diseases there are in which the etiologic agent has been established but in which it has not yet been possible to fulfill Koch's postulates. The organisms of the normal lymphatic glands have added greatly to the difficulty of determining the significance of the organism described by Negri and Miereme[1] and by Bunting and Yates[2] in Hodgkin's disease. In the present paper, I wish to report the results of bacterial cultures made from human spleens and to discuss especially an anaerobic bacillus which was found. The work is of interest largely on account of the relationship of this organism to the bacillus that has recently been described in typhus

*Read at the Thirteenth Annual Meeting of the American Society of Tropical Medicine, held in Washington, D. C., May 9, 10, 11, 1916. Also printed in the **Journal of Immunology,** Vol. 1, No. 3, p. 321-339.

fever. An article which attracted wide attention in the past year is the report by Plotz[3] and his associates on the etiology of typhus fever. Plotz described very carefully an extremely interesting bacillus and presented evidence regarding its etiologic relationship to typhus fever, more especially by serologic reactions, since it was impossible to fulfill Koch's postulates with this organism. In addition to the collection of a large amount of positive evidence, Plotz also carried out an extensive series of control cultures in conditions other than typhus (198 cases) and also in typhus cases after convalescence. The results were very interesting; the bacillus found in the acute stage of typhus fever was not recovered in any of these controls.

In searching for bacteria in the body, under normal conditions it is much easier to obtain them through the lymph glands and the viscera from the circulating blood. During the past two years, I have had an opportunity of making cultures at the Massachusetts General Hospital, upon spleens removed in the surgical service. The majority of these splenectomies were performed for pernicious anemia. The routine of the bacteriological examination was as follows: After thoroughly searing part of the surface of the spleen, a fairly large piece of splenic tissue was cut out under aseptic precautions. Small pieces of this, 3 to 5 mm. square, and 2 to 3 and sometimes 5 mm. in thickness, were used for inoculation. The following media were employed, litmus milk, blood agar (using 1 part of agar to 1 part of human blood), citrated blood (using 1 part of human blood to 4 parts of 2 per cent sodium citrate in normal salt solution), bile broth (½ per cent sodium glycocholate in ordinary bouillon ½ per cent acid), Ficker's brain medium[4], Dorsett's egg medium and glucose (2 per cent) ascitic agar, ordinary agar, 2 per cent glucose agar, and 7 per cent glycerin agar. The media containing blood were incubated aerobically at room temperature for the possible development of protozoa; the cultures remained sterile. The litmus milk, Ficker's and Dorsett's medium and the glucose ascitic agar were incubated both aerobically and anaerobically. Especial attention was given to the litmus milk, usually a dozen tubes were inoculated, eight of which were incubated anaerobically and four aerobically. The plain agar, the glycerin and glucose agar were used as controls for ordinary

contaminations and secondary invaders and were incubated aerobically.

Comparatively few of the spleens proved to be sterile. In the accompanying outline, Table 1, I have mentioned only those media upon which growth occurred.

Table 1

Showing the results of cultures from spleens

SERIAL NO.	DIAGNOSIS	RESULT
1	Pernicious anemia	Micrococcus from bile tubes
3	Pernicious anemia	Sterile
3	Pernicious anemia	Micrococcus from bile and milk tubes
4	Pernicious anemia	Micrococcus from bile and milk tubes
5	Simple hypertrophy	Sterile
6	Pernicious anemia	Anaerobic bacillus from milk tubes
7	Infantile primary splenomegaly	Sterile
8	Pernicious anemia	Anaerobic bacillus from milk tubes*
9	Pernicious anemia	Sterile
10	Pernicious anemia	Anaerobic bacillus from milk tubes

*One of the milk tubes also showed a micrococcus.

In all of these cultures, it is noteworthy that no definite diphtheroids were obtained. This result is suggestive of a difference in the flora of the spleen and lymphatic glands.

No growth occurred in any of the tubes of plain agar or of glucose or glycerin agar. None of them were incubated anaerobically, but it is extremely unlikely that the anaerobic bacillus, found in three cases, would have developed since, even upon subinoculation, it would not grow upon these agar media without enrichment with body fluids and it was not obtained by direct inoculation from the spleen into ascitic glucose agar containing a piece of tissue (this tissue being furnished by inoculation of a rather large piece of the spleen under examination).

The micrococcus appearing in cases 1, 3 and 4, grew out both aerobically and anaerobically, but only in fluid media; namely, bile and milk. On subinoculation, however, it grew freely on glucose agar but scantily, indeed, upon plain agar. No attempt was made to establish the identity of these three cultures of micrococci to one another. They differed definitely, however, from the ordinary staphylococcus aureus and albus and from six strains of micrococci isolated from the air. Culturally, the most important characteristic was the necessity of using glucose agar to obtain a good growth. Morphologically, the organisms were distinctly pleochromic. This characteristic was seen very well

with either methylene blue or Giemsa's stain. The preparations stained with methylene blue frequently showed small clusters of six or eight organisms, perhaps half of the organisms staining a solid, uniform color, while the others would stain only at the periphery, appearing just as blue rings, some faintly and some deeply stained.

Tests for complement fixation were carried out with the micrococcus from spleen 4, against the sera of cases of pernicious anemia and normal sera. As further control, antigens were made from a Gram positive coccus obtained from the air and also from the gonococcus, in order to have a representative of the pus-forming cocci. The routine employed for complement fixation was the same as that described later in connection with the work on the anaerobic bacillus.

Complement fixation occurred in four of five cases of pernicious anemia and complete haemolysis resulted in five control cases. However, the same results with equally strong reactions occurred with the antigens prepared from the coccus from the air, whereas, with the gonococcal antigen, the same cases were positive and the reactions were even stronger in two instances. The Wassermann reaction in these cases, using a cholesterinized human heart antigen, was also positive at this time, though previously it had been repeatedly negative. Specific venereal disease could be excluded with reasonable certainty except for a possible question of syphilis in one of the splenectomized patients. Clinically, the most important feature which might bear upon these results, is that the four cases giving positive fixation reactions had been splenectomized from four to eight months previously, whereas, the one case giving a negative reaction had not been splenectomized. Furthermore, upon repeating these tests six weeks later, the reactions were negative in all instances to all of these four antigens. One of the patients, who was subsequently followed for several months, showed reactions that fluctuated from negative to strongly positive.

The anaerobic bacillus occurring in three cases is of interest, both from its possible causative relationship to pernicious anemia and from its striking resemblance to the organism found by Plotz in typhus fever. This bacillus appeared only in the tubes of litmus milk, incubated anaerobically. Growth appeared usu-

ally in three to five days, though sometimes it was delayed until the tenth or fourteenth day. The litmus was either acidified or decolorized and the protein was precipitated, but without the formation of a clot. Of eight or ten tubes, inoculated in this way from each case, there were always two or three in which no growth could be found. Usually no change occurred in the milk unless bacterial growth developed. In some instances, the splenic tissue caused a precipitate of the proteins, but without acidification. After a month, negative cultures were discarded.

Of all the aerobic cultures of litmus milk, there was but one tube showing the development of the bacillus that usually appeared only in the anaerobic cultures. On subinoculation, no growth could be obtained except under anaerobic conditions equally as strict as those required by the cultures developing from this same spleen in the tubes placed in an anaerobic jar. Consequently, although the tube was not placed in an anaerobic jar, it does not seem possible that this development occurred under aerobic conditions. Theobald Smith[2], at the time that he introduced this method, emphazised the possibility of obtaining a high grade of anaerobic conditions in an open tube by the use of a piece of tissue. In considering the frequency with which this organism occurred in the cases of pernicious anemia, there is one feature that should be emphasized. The examination of the cases in Table 1 covered a period of two years, with an interim of eight months between cases 5 and 6, the first anaerobic bacillus being found in case 6. Although the same routine examination was followed throughout all the entire period, still it is not unlikely that this bacillus was overlooked, as it was not searched for specifically. Consequently, neither the positive nor the negative cases from 1 to 5, inclusive, are of quite the same value as the subsequent ones. Of the five cases, then, in which systematic examination was carried out for this bacillus, it was found in three or four cases of pernicious anemia, one case of pernicious anemia and one control case being negative.

Unfortunately, I obtained no data in regard to the relative numbers of these organisms in the spleen; consequently, there is no evidence at hand to determine whether this organism had colonized and was multiplying or whether it was merely filtered out from the blood by the spleen. The estimation of the number

of these organisms in the spleen is not easy, for it grows with difficulty even on subinoculation, and in the original isolation from the spleen it has so far grown only in fluid media. Although a certain proportion, about one-fourth, of the tubes of milk remained sterile even when inoculated with large pieces of tissue, still it is entirely possible that the organisms may have been present in fairly large numbers. It is not unlikely that only a small proportion of the organisms develop, for the splenic tissue, while providing excellent anaerobic conditions, may, nevertheless, have restrained the growth of these bacteria. There is, perhaps, some indication for this view in the fact that subcultures grew readily on glucose ascitic agar but inoculations of infected splenic tissue failed to give growths on this medium. Another illustration of the restraining influence of body fluids was found in the use of hydrocele fluid of high specific gravity (1.025). Growth took place much more readily when a few drops (½ cc.) of this fluid were used with 20 cc. of glucose agar than when large amounts (7 cc.) were employed. With the larger quantity, good growth took place, though the first appearance of growth was restrained for several days (three to five) after it had appeared in the tubes containing only a little hydrocele fluid. Tissues fixed in Zenker's fluid and stained by the Gram-Weigert method did not show any definite microorganisms.

Cultures of the bacilli from spleens 6, 8 and 10 showed no pathogenicity for lower animals. Rabbits were inoculated intravenously, and mice, rats and guinea pigs were inoculated intraperitoneally without the production of any noticeable effect.

DESCRIPTION OF ANAEROBIC BACILLUS

Morphology and Staining Properties.—In young cultures, this organism is a small, short bacillus, moderately blunt at the ends and non-motile, measuring usually 1 to 1.5 microns in length. The individual organisms do not vary much in size and shape until the cultures become old. Then distinct pleomorphism appears; many coccoid forms are found and occasionally some forms appear that slightly suggest the diphtheroid group. Young cultures are stained readily and uniformly with the ordinary aniline dyes and very intensely with Gram's stain. Smears from cultures were stained for three minutes with anilin-

gentian violet and, without rinsing in water, were washed for one minute with Gram's iodin; they did not decolorize after fifteen minutes' washing in 95 per cent alcohol.

Cultural Characteristics.—The organism requires anaerobic conditions for its growth and develops best on media that have been enriched with body fluids or tissues. No growth occurs, either aerobically or anaerobically on ordinary litmus milk or on broth or agar, either plain or with the addition of glucose or glycerin. Excellent growth occurs in tubes of litmus milk containing a piece of tissue (rabbit kidney or spleen) and placed in an anaerobic jar or in deep glucose ascitic agar tubes even without any further measures for removing the oxygen. Growth in these tubes extends upward to within 2 cm. of the surface, without gas production, but with the formation of acid and intense clouding from the precipitation of the proteins in the medium. No growth was obtained on the blood agar using the triple N medium of Novy, MacNeal and Nicolle, substituting human for rabbit's blood. On Dorsett's egg medium a scanty growth occurred, which soon died out on subinoculation. A strain of the Plotz bacillus behaved in a similar manner on Dorsett's medium. The bacillus, therefore, in its morphology, its staining reactions and in its cardinal cultural characteristics does not differ from the organism discovered by Plotz in typhus fever.

The anaerobe from spleen 10 was killed by heating for fifteen minutes at 55° C.

The next point that was taken up was the significance of these anaerobic cultures from the spleens of cases of pernicious anemia. As a preliminary step, it was, of course, necessary to determine the relationship of these three strains to each other. The relationship to the Plotz bacillus, however, is a much more interesting feature and also offers valuable information in establishing the position of these cultures from the spleen. Accordingly, a detailed comparison was made of these three strains of anaerobes with each other and with the typhus organism, both in regard to their fermentation of various carbohydrates and in regard to their serological reactions.

In the absence of Dr. Plotz in Serbia, Dr. Libman of the Mount Sinai Hospital in New York very kindly furnished a

strain of the Plotz organism. In his report on typhus fever, Plotz and his associates described in detail the behavior of his organism on various carbohydrates and its serological reactions. Accordingly, I have used these same carbohydrates and have performed serological reactions with human blood serum in a variety of diseases and with the serum of rabbits immunized against these organisms.

The cultures on carbohydrates were carried out as described by Plotz, 3 per cent agar faintly tinted with litmus being used, with an acidity of 1 per cent N acid to phenolphthalein, with 2 per cent of carbohydrate and with one part of ascitic fluid to three parts of agar. The cultures were incubated usually for six days and occasionally for eight days, when the growth was late in appearing. Unfortunately, with the same strain of bacillus and the same carbohydrate the results, in some instances, varied somewhat. It seems that the result depended, in part, upon the luxuriance of growth that was obtained, and this, in turn, varied with different specimens of ascitic and hydrocele fluid. Some difficulty was experienced in making up 2 per cent of inulin in 3 per cent agar. The inulin was made into a thin paste in cold water and this was stirred gradually into the hot agar (100° C.). Solution appeared to be complete, but a precipitate subsequently occurred during sterilization.

The fermentation tests showed that one of these bacilli from pernicious anemia differs slightly from the other two and that none of the three coincide fully with the Plotz organism in their behavior on carbohydrates. Of the ten that were tested, production of gas did not occur in any instance. Fermentation, with the production of acid in sufficient amount to cause precipitation of the protein in the medium, occurred in the following instances: Glucose, maltose, galactose and mannite, and occasionally a faint precipitate with lactose. The strain of culture from spleen 6 gave a faintly acid reaction in three of nine cultures on lactose. The fermentation of mannite constitutes a definite exception to the fermentation reactions of the Plotz bacillus. The cultures from spleen 6 and spleen 8 grew well on mannite and fermented it rather easily with the production of acid and a well-marked precipitation of protein. With lactose, however, there was not much difference between

these organisms and the bacillus found in typhus fever. The fermentation of this sugar was, at most, very slight and usually it did not occur at all. In this connection, it is of interest that although Plotz found no fermentation by any strains of his organisms growing on litmus lactose ascitic agar, still, slight fermentation occurred in litmus milk. This, however, does not necessarily mean that the lactose of the milk was fermented, since Plotz' organism ferments galactose very readily. One possible source of galactose in milk would be the splitting of the lactose by slight bacterial fermentation before sterilization of the milk was effected. In this connection, it should be noted that *B. typhosus* does not split lactose, but does slightly acidify litmus milk.

Turning to the carbohydrates that are not fermented by the bacilli from the spleen, we have the following: Saccharose, arabinose, raffinose, inulin and, in most instances, lactose. Of this list, it should be mentioned that growth was secured on all these carbohydrates, although no fermentation resulted. Considerable difficulty was experienced in obtaining growth on raffinose, arabinose and inulin, and, at best, the growth was always scanty. Growth took place readily on saccharose and not much difficulty was experienced with lactose or dextrine. The three strains of bacilli from the spleen agree rather closely with each other, and their principal difference from the typhus bacillus lies in their reactions on inulin and mannite, the typhus organism fermenting inulin and not mannite, while the reverse is true with two of these cultures from the spleen. However, the strain from spleen 10 does not ferment mannite and differs from the Plotz' bacillus only in its failure to ferment inulin. In this connection, I wish to explain that the technic of the proper preparation of inulin and the cultivation of the Plotz' organism on it was very difficult for me. In fact, the typhus organism is extremely capricious in its growth and Plotz deserves great credit for establishing a practical method for its cultivation. But even when working with a strain of the typhus organism, I was unable to secure clear-cut fermentation of inulin.

None of these cultures from the spleen coincide exactly in their growth on carbohydrates with the typhus bacillus. The differences, however, are not greater than occur, for example, in

different members of the species *B. diphtheriæ* or *B. dysenteriæ*. So far as the fermentation tests go, then, if we interpret them in the light of the findings in diphtheria and bacillary dysentery, we must conclude that these organisms from pernicious anemia and from typhus fever are very intimately related members of a single group of bacteria—that they are varieties of a single species.

In the serological work, agglutinations and complement fixation tests were performed. In carrying out the agglutination tests, one is at a disadvantage on account of the tendency that some of these cultures show to clump spontaneously in salt solution without the addition of serum. In view of this difficulty, only a few agglutination tests were performed. My attention has recently been called to a method by which this difficulty can probably be overcome. In working with bubonic plague Strong and Teague[6] found that 1-10 per cent of sodium chloride would prevent the spontaneous clumping and still furnish sufficient salt to allow specific agglutination.

The following routine was observed in the serological work: For agglutination tests, a young culture five days old, on glucose ascitic agar was used. Olitsky recommends the microscopic method, carrying out the test very rapidly, before spontaneous agglutination can occur in the controls in salt solution, preferably within one hour. With the necessity of observing this time limit, I found it rather difficult to secure satisfactory readings when working with an extensive series of preparations. One strain of the organism from pernicious anemia, case 6, was found which did not clump excessively in salt solution. A very thin suspension was prepared and macroscopic tests were performed. The preparations were left at room temperature for an hour and were read after they had stood over night in the refrigerator.

In the preparation of the antigen for complement fixation, the digestion of the bacterial suspension in distilled water was carried out at 37° C. for periods of ten to fourteen days. This long period seemed necessary for even a moderate breaking up of the strongly Gram-positive bacilli. Moreover, instead of filtration through a Berkefeld filter, the suspension, after digestion, was centrifuged for a short time, at low speed. The supernatant fluid was distinctly opalescent and, on standing, it tended

to settle out only very slowly, indeed. Before use, it was of course made isotonic with salt solution. This method of preparation of bacterial antigens has, in general, yielded products of high antigenic value and comparatively low anticomplementary power, in contrast with the short digestion and filtration through a Berkefeld candle, as advised by Olitsky. The usual standard procedures were followed in the tests for complement fixation. In the titration of the antigens for anticomplementary power, one-half the amount that just permitted complete hemolysis was usually employed. In some special cases, the fixing power of the antigen was so strong that the dose was reduced to one-fourth of the maximal amount that allowed complete hemolysis. The customary sheep-cell, rabbit-serum hemolytic system with guinea pig complement was employed, two hemolytic units being used. Of the serum to be tested, 0.1 cc., undiluted, was employed in a total volume of 2.2 cc. In the selection of rabbits for immunization, it is extremely important to select individual animals that do not exhibit non-specific complement fixation. Not infrequently individual normal animals occur that give positive reactions with both the Wassermann and the gonococcal antigens, reactions which, in the human, are in no way interdependent. It was found that animals giving this non-specific fixation in the Wassermann and the gonococcus tests, also fixed complement with the Plotz organism and with the bacillus from the spleens. Fortunately, Kolmer and Trist[7] have found that the reaction in normal animals tends to be constant and does not fluctuate from positive to negative. My own experience agrees with this. Accordingly, at the beginning of the experiment, animals were selected for immunization and for normal controls whose fixation reactions were negative to these antigens. Complement fixation tests on the bacilli from the cases of pernicious anemia against the serum of rabbits immunized to these organisms showed a definite cross-fixation. The accompanying outline gives the results for either an antigen or an immune serum of each of the three strains of anærobes from pernicious anemia.

For comparison of the Plotz bacillus with these anaerobes, some preliminary fixation reactions were carried out by testing an antigen from the organisms from spleen 6 against a corre-

DEGREE OF FIXATION

RABBIT SERUM IMMUNE TO BACILLUS FROM		ANTIGEN FROM SPLEEN VI	BACILLUS FROM SPLEEN VIII
Spleen VI	1	Complete	None
	2	Complete	Complete
Spleen X	3	Complete	Complete
	4	Complete	Complete
	A	None	None
Normal rabbits	B	None	Trace
	C	None	Trace

Complete, No hemolysis. None, Complete hemolysis. Trace, Almost complete hemolysis.

sponding immune rabbit serum, an immune serum from a rabbit injected with the Plotz organism and against a variety of human sera. In order to guard against the occurrence of very general non-specific fixation, the reactions to a Wassermann antigen (cholesterinized human heart) are included. A corresponding set of agglutination reactions were carried out with this bacillus and these sera. The results show both cross-fixation and cross-agglutination. The data are given in Table 2.

These results were confirmed on a larger scale, antigens being used that had been made from bacilli isolated from two of the spleens (cases 6 and 8) and from the Plotz bacillus. These were tested against patients and against rabbits immune to the Plotz bacillus and to two of the strains of organisms obtained from the spleens (cases 7 and 10). For these tests one of the rabbits immunized against the organism from spleen 6 had died suddenly. In its place a rabbit was substituted that had been injected four months previously with this strain of organism.

The results are of interest since cross-fixation occurs freely and practically constantly between the various sera and antigens. There is only one apparent exception and this occurs in the animal that had not been injected for a long period. Its immunity was evidently not of high grade, since absolutely complete fixation was not obtained with its own antigen and it failed to cross fix with the other sera. A duplicate animal immunized more recently than this one did give cross-fixations. Although the serum of this animal, which had not been recently injected, failed to give cross-fixation, yet the antigen gave cross-fixation with the sera of other animals immunized to the organism from spleen 10.

The results of these fixation tests furnish definite evidence of

a close relationship between these bacilli and do not supply evidence of any difference between them.

The data are given in Table 3.

Table 2

Complement fixation and agglutination with organism from Spleen 6

COMPLEMENT FIXATION				AGGLUTINATION OF BACILLUS FROM SPLEEN VI	
Immune to		Antigen from organism of Spleen VI	Wassermann	Dilution of serum	
				1-50	1-100
Organism from Spleen VI	1	Complete	None	Partial	None
	2	Complete	None	Complete	Complete
	5	Complete	None	Complete	Complete
Plotz' organism	6	Complete	None	Complete	Complete
Normal	A	None	None	None	None
	B	None	None	None	None
	C	None	None	None	None
	D	None	None	None	None
	E	Almost complete	Almost complete	Partial	None
Patients' serum					
Diagnosis:					
Pernicious anemia	1	Trace	Partial	None	None
	2	Trace	Complete	None	None
	3	Trace	None	None	None
	4	Trace	None	Well marked	None
	5	None	None	Well marked	None
	6	Complete	None	Well marked	None
Secondary anemia	7	Partial	None	None	None
	8	Trace	None	Well marked	None
Cerebrospinal syphilis	9	Almost complete	Partial	None	None
Tabes	10	Complete	Partial	None	Well marked
Endocarditis	11	Trace	None	None	None
Lobar pneumonia	12	Partial	None	None	None
Aortitis	13	Complete	None	Well marked	None
Peritonsillar abscess	14	Complete	None	Complete	Complete
Gastric ulcer	15	Trace	None	Partial	None
Myasthenia gravis	16	Complete	None	Well marked	None
Visceroptosis	17	Trace	None	Well marked	None
Hyperthyroidism	18	None	None		

The following fixation tests were carried out with the organism from spleen 8 and with the Plotz bacillus against human sera, three cases of pernicious anemia and five control sera being used. The results are given in Table 4.

Complete fixation in two out of eight cases tested against the Plotz antigen seemed rather unexpected, especially as the antigen was used in only half the quantity that was permissible from

Table 3

Showing cross fixation tests with rabbit sera toward antigens of the Plotz' bacillus and the bacillus from pernicious anemia

IMMUNE SERA FOR ORGANISMS OF		DEGREE OF FIXATION		
		Antigens		
		Spleen VI	Spleen VIII	Plotz' bacillus
Spleen VI	1	Almost complete	Complete	Complete
Spleen X	2	Almost complete	Almost complete	Complete
	3	Complete	Complete	Complete
Plotz'	4	Complete	Complete	Complete
	5	Complete	None	None
	6	Complete	Complete	Complete
Normal rabbit sera	A	None	None	None
	B	None	Trace	Trace
	C	None	Trace	Partial

Table 4

Showing fixation with serum of pernicious anemia and control cases

CASE NUMBER	DIAGNOSIS	DEGREE OF FIXATION		
		Antigen		
		Bacillus Spleen VIII	Plotz' bacillus	Wassermann
1	Pernicious anemia	None	None	None
2	Pernicious anemia	Complete	Complete	None
3	Pernicious anemia	None	None	None
4	Cholangitis	Complete	Complete	Complete
5	Gastric neurosis	None	None	None
6	Arterio-sclerosis	None	None	None
7	Gastric neurosis	None	None	None
8	Mitral insufficiency	None	None	None

Both the antigens of the bacillus of Plotz and of Spleen 8 were used in one-fourth the dose that just failed to cause inhibition of hæmolysis.

the standpoint of its anticomplementary power. Seventeen additional patients were tested to determine whether complete fixation is as frequent as these results indicate and in these cases complete hemolysis occurred in all except three; in these the hemolysis was only partial. The fact that complement fixation may be obtained with this antigen in diseases other than typhus fever does not impair the value of the fixation tests reported by Olitsky in typhus cases. Obviously, in diagnosing a disease by complement fixation tests, it is necessary, first of all, to reduce the quantity of antigen or otherwise to adjust the conditions so that no normal sera will give positive reactions. While it is important to know that non-typhus cases will fix complement rather readily with this antigen, the striking feature in these results is that the reactions of the bacillus from the spleen coincide

precisely with those of the Plotz bacillus. This is further indication of some biological relationship between these organisms.

INTERPRETATION OF RESULTS.

It is evident that there is a close relationship in the essential characteristics of this bacillus cultivated from the spleen and the bacillus isolated by Plotz. The interpretation that suggests itself most readily is that these organisms are normal inhabitants of the body and that, although they are highly parasitic, they are not pathogenic. The slight difference in the fermentation of sugars does not militate against the assumption that these bacilli from pernicious anemia and typhus fever belong essentially to one species. It will be remembered that Plotz found the various strains of his organism to be entirely constant in their fermentation reactions. Nevertheless, it does not seem improbable that a more extended series would reveal some variation. If this bacillus from the spleen should develop in cultures made for the diagnosis of typhus fever it could not be distinguished from the Plotz bacillus except by a detailed study of its reaction on carbohydrates. The small series of agglutination tests indicate the close relationship of the bacillus from the spleens to the Plotz bacillus, and the complement fixation tests are in agreement with this conclusion. However, complement fixation can at times be the least specific of the immunity reactions. Failure to show cross fixation would speak strongly in favor of distinct species, whereas positive results do not merit so much significance.

The finding of the Plotz bacillus in Brill's disease has been advanced as additional evidence of the identity of this disease and typhus fever, but this argument loses its significance more or less completely when this same bacillus is found in an entirely different disease.

If we consider the bacillus described by Plotz to be the cause of typhus fever, then it would be conceivable that this anaerobic organism from these spleens might be the cause of pernicious anemia. Although widely different parasites may produce almost identical symptoms, we do not have any well-established instances in which organisms that are closely related biologically produce widely divergent clinical effects. One example which suggests itself is the skin lesions of *B. lepræ* and *B. tuberculosis.*

However, on closer examination, the skin lesions caused by the two organisms from the standpoint of histology are closely related. Another example for consideration is the skin lesion produced by *Leishmania tropica* and kala azar produced by *L. donovani,* but in this case the differentation of these forms into two species is now being called into question. With the limited amount of data at hand, it is difficult absolutely to exclude this bacillus, isolated from cases of pernicious anemia, as the possible etiologic factor of the disease, with definite proof that would meet all theoretical objections; at least this is true when we consider the number of diseases in which the etiologic factor is established without fulfilling Koch's postulates and the widely divergent bases upon which investigators in different fields propose new etiologic organisms. Perhaps crucial evidence would be obtained by the examination of normal spleens. The bacteriological study of the spleen is not very satisfactory, except under special conditions. It seemed worth while to report the results of the cultures from these spleens without waiting for controls from other conditions, since surgical removal of the spleen is rather uncommon. However, I should be very much surprised if subsequent examination showed the bacillus found in pernicious anemia to be specific for this disease and that it did not occur in other conditions. Nevertheless, except for the knowledge of the Plotz organism and its relation to typhus fever, I am sure that it would be much more difficult for me to dissuade myself of a possible etiologic rôle of this organism in pernicious anemia.

The simplest interpretation of these results is that the bacillus isolated from the spleen of cases of pernicious anemia and from the blood of cases of typhus fever is merely a part of the normal flora of the body. Such organisms might gain a better foothold during the course of a serious disease, especially in a severe infection or pronounced anemia. There are several suggestive points that support this view. It is significant that antigens prepared from the bacillus isolated from the spleen fix complement indifferently with cases of pernicious anemia and with other diseases. The isolation of organisms evidently belonging to the same species from such widely different conditions as pernicious anemia and typhus fever, constitutes extremely strong evidence that they are not the causative agent of

either disease. On the other hand, it mus be kept in mind that in a long series of blood cultures in control cases, Plotz, in no instance, found the organism which occurred so frequently in typhus fever. Furthermore, Olitzsky found that complement fixation gave positive reactions in a high percentage of typhus cases under conditions in which non-typhus cases reacted negatively.

Plotz has evidently discovered a new organism or a new group of organisms which are highly parasitic. They are non-pathogenic for lower animals and probably non-pathogenic for man. The recognition of this anaerobic organism constitutes an important advance in bacteriology. I would like to think that a new etiologic agent had been discovered. However, I am not prepared to accept that either the anaerobic bacillus isolated from typhus fever or from the spleen of cases of pernicious anemia is the specific etiologic agent in either disease.

CONCLUSIONS

1. Bacterial cultures were made of human spleens removed for surgical purposes in ten cases. The cultures from four of these spleens remained sterile. In three instances, a micrococcus was obtained and in three other cases an anaerobic bacillus developed.

2. The anaerobic bacillus in its morphology, in its cultural characteristics and in its serological reactions resembled very closely the bacillus isolated by Plotz in typhus fever. The evidence which is at present available indicates that these anaerobic bacilli, isolated by Plotz from typhus fever and appearing also in cases of pernicious anemia, constitute essentially a single species.

3. The weight of evidence indicates that this group of organisms represents parasitic but non-pathogenic flora of the human body. There is not sufficient evidence to ascribe a specific etiologic role to members of this group of anaerobic bacilli in either typhus fever or in pernicious anemia.

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THE ETIOLOGY OF ROCKY MOUNTAIN SPOTTED FEVER.*

OCCURRENCE OF THE PARASITE IN THE TICK.

Second Preliminary Report

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The demonstration of a parasite in the lesions of experimental Rocky Mountain spotted fever in monkeys and guinea pigs was reported in the *Journal of Medical Research* (Vol. XXXIV., No. 1) for March, 1916. The purpose of the present report is to record the presence and distribution of the parasite in experimentally infected ticks—*Dermacentor andersoni,* Stiles (*Dermacentor venustus,* Banks). The ticks in this study were sent from Montana by Prof. R. A. Cooley, State Entomologist, to whom I express my thanks.

Infected ticks were secured by allowing them to feed one or more times upon infected guinea pigs. Their infectivity was subsequently proved by allowing them to feed upon normal guinea pigs. Ticks which were proved to be noninfective by feeding once or twice upon normal guinea pigs were used for controls.

In testing for infectivity of the ticks, each one was confined in a close-meshed wire gauze capsule, fastened with adhesive plaster to the shaved abdomen of a guinea pig. From two to five days were allowed for each feeding. The capsules served also to retain the feces passed by the ticks, the amount of which in each experiment offered an additional index to the amount of blood ingested. It was observed that the feces collect in the form of small balls, which soon become hard and dry and do not soil the skin of the guinea pig.

The procedure usually employed in examining the ticks, infected and control, was as follows: The dorsal surface was removed as carefully as possible under the dissecting microscope. From one-half of the tick, salivary gland, Malpighian tube, leg muscle and a portion of the intestinal diverticulum were removed and smear preparations were made which were stained

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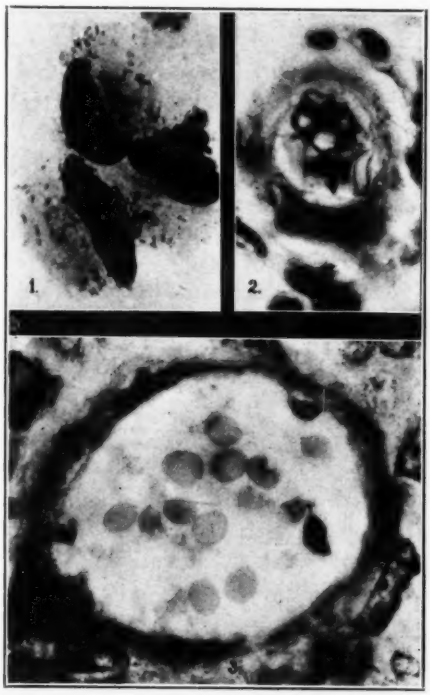
with Giemsa's stain, as well as preparations for the microscope with dark field illumination. The remainder of the organs were then removed in one mass from the ventral plate. The capitulum is left attached to the organs for the purpose of handling during fixation and imbedding processes. The tissues were fixed in Zenker's fixative, imbedded in paraffin, and serial sections made, which were stained by the modified Giemsa method described in the first report. In ticks which were proved to be infective, parasites identical with those found in the tissues of guinea pigs and monkeys were found. In no instance were they found in ticks which were proved to be noninfective.

The distribution of the parasite in the infected tick is wide and subject to some variation. They are found most abundantly in striped muscle, though occasionally they may occur in enormous numbers in the Malpighian tubes, both in the epithelial cells and in the lumina of the tubes. They are very numerous in the ganglion, or brain, in the main nerve trunks, in the salivary glands and walls of the salivary gland ducts. They are numerous in the smooth muscle fibers of the uterus and vagina. They are occasionally very numerous in the esophagus and are always to be found sparsely distributed throughout the intestinal tract. They have been seen in spermatozoa.

It is worthy of note that there is no cellular reaction on the part of the tick to the presence of these parasites, even when they are present in enormous numbers. A similar absence of reaction to the presence of a parasite, *Spirocheta duttoni*, was observed by me in the tissues of the African tick. *Ornithodorous moubata* (*Journal of Medical Research*, Vol. XXX., No. 1). The morphology of the parasite is identical with that found in guinea pig and monkey tissues. It is possible now definitely to state that there are two principal morphological types—one, a lanceolate diplococcoid organism, which is considerably larger than the other type, a small, rather slender rod-shaped form. The lanceolate type is also found in the circulating blood and stains fairly deeply with the chromatin coloration, that is, reddish purple; at each end there is a small amount of pale-blue staining material. The smaller, rod-like form stains bluish, or bluish purple, according to variations in the staining technic, and may contain granules, bi-polar or more numerous,

as were described in preparations from guinea-pigs. It is obviously poor in chromatin staining material. To these types may be added a third, which, however, probably should be included with the rod form. It is a minute oval coccoid form which ranges in size down to forms just visible with the best optical equipment. They stain bluish with Giemsa's stain and have been found most abundantly in smear preparations of infected ticks. They are also to be seen in the sections in masses within cells, too compact to be resolved except at the periphery of the clumps.

No new light has been obtained in regard to the exact nature of this organism. The arrangement in pairs, end to end, and in tissues in chains of considerable length supports the evidence already obtained that division is by transverse fission as in bacteria. The lanceolate is the only form found with any con-



sistency in the circulating blood of infected animals, and it is reasonable to suppose that this represents a more resistant stage, although no proof has been obtained on that point. The organism as observed in suspensions of crushed tissues of the tick by dark-field illumination is non-motile. It does not retain the stain of Gram's method.

A detailed account of the experiments upon which the above observations have been made and more exact descriptions of the parasite will be given in a later publication.

Summary.

A parasite has been found in proved infected ticks in large numbers, morphologically identical with the parasite found in the lesions of guinea pigs and monkeys infected with Rocky Mountain spotted fever.

This parasite does not occur in the tissues of ticks proved to be non-infective.

The distribution of the parasite in the infected ticks indicates that the transmission occurs by way of the salivary gland secretions.

Transmission by fecal contamination of the wound caused by the tick does not seem possible because of the character of the tick's feces.

CURRENT LITERATURE

CREOLIN FOR SCABIES (Montgomery).—The following is suggested for the treatment of scabies in infants and commends itself for the reasons that it is simple, cheap, easily applied and as easily washed off and, last and best, it has the quality of an alkalin antipruritic:

Creolin	10
Saponis viridis	30
Adipis benzoinat .....qs. ad.	100

To be rubbed on once a day.—*Therapeutic Gazette* (*Archives of Ped.*).

IS THE GALL BLADDER USELESS? (V. A. Lapenta, M. D., Indiapolis).—This vesicle acts as a bulb to further the passage of bile, regulating the pressure and serving as a reservoir. When the gall bladder is removed the common duct is dilated and in a way becomes a compensatory bladder. Experiments on dogs showed that the duct became dilated and even bulbous after cholecystectomy. Gall stones after cholecystectomy are frequent For these and other reasons, protest is made against looking on the gall bladder as in the same class with the vermiform appendix and as unnecessary. Cholecystectomy is often mandatory, but not necessarily the operation of choice in all gall bladder and duct disturbances. The gall bladder is not a functionless organ and its removal should be undertaken only for reason, or, as the author puts it, "for truly great surgery is conservative, and radical only when unredeemable pathological lesions force her hand to summary action."—*Interstate Medical Journal,* November, 1916; pages 993-5.

TREATMENT OF CHOLECYSTITIS AND CHOLANGITIS (R. A. Bate, M. D., Louisville).—In the treatment of cholecystitis and cholangitis complicated by gall stones, the bismuth preparations seem decidedly harmful instead of beneficial. There are several drugs which are supposed to enter into combination with the biliary constituents, and the specific action of these various medicaments may be thus secured. Of these drugs perhaps the valerianate of amyl offers the most promising results. It not only acts as a sedative and quiets the muscular spasm, but

also has a solvent effect upon cholesterin; for these reasons it should be used in all cases instead of morphin, which has been most highly recommended. Of the various fatty substances or oils which have been advocated, glycerin is now coming into prominence. As lecithin is a normal constituent of bile and also a solvent of cholesterin, any medicament containing lecithin is indicated. The explanation of the tremendous popularity of olive oil in the treatment of gall stones is because of the large percentage of lecithin it contains.—*Therapeutic Gazette*, November 15, 1916, page 767.

SCHISTOSOMIASIS.—Schistosomiasis in the Orient is a disease caused by a blood fluke inhabiting principally the blood vessels of the portal system. In a preliminary report W. L. Mann, Cavite, P. I., describes an epidemic occurring in a number of the crew of the U. S. S. *Helena* at Ichang on the upper Yangtsze river. All of his patients had been in a landing party to gorges above Ichang, and had bathed in subsidiary streams. The symptoms in the first stage are those of the so-called urticarial or Yangstze fever. The symptoms of urticaria, subcutaneous edema and fever, appeared in from twenty-four to seventy-two hours after exposure to the infected water. In eight out of ten cases there were diarrhea, in seven with cramps, and four of the eight were troubled with nausea and vomiting. There were pain and tenderness over the liver in one-third of the patients, and half of them were troubled with cough and other symptoms of lung infection, in one case even suggesting incipient pneumonia. In the second stage of the disease, when the fever has almost disappeared, the eggs appear in the stool, and the symptoms may be divided into those of convalescence and those that go on to the third stage. This last is most important to keep in mind when treating former residents of the Orient. While continual reinfections are apparently necessary for the production of the tertiary stage, it seems reasonable to suppose that some parasites may persist in the body, causing various symptoms, such as cough, diarrhea, and temporary abdominal pain and tenderness, hepatic disturbances, anemia, fever, etc. The diagnosis, unfortunately, is often difficult. The worms are not numerous enough for ova to be easily located, and eosinophilia may vary. The mental attitude in this disease is pecu-

liar, ranging from calmness and indifference to dulness and confusion. The patient is apathetic, and sometimes even with marked fever goes about his usual occupations. The third stage is rare in foreigners, and consists of hepatic and splenic hypertropy followed by sinking of the liver, cachexia, emaciation, ascites, and finally general anasarca. Dyspeptic symptoms are pronounced, associated with dysentery and diarrhea. In the first stage the diagnosis is not difficult if accompanied by the usual rash and subcutaneous edema. The eosinophilia, which appears within three or four weeks, is often marked. The ova begin to appear in the stools in about a month after the infection, and are found in bits of bloodstreaked mucus on a hardened stool. It is well to give opium for two days before examination in order to get hardened stools. Reports of the cases are given, and in a number of them benefit was obtained by the administration of salvarsan, and in cases in which there was little probability of a syphilitic affection. The possible relation of schistosomiasis to tropical neurasthenia is suggested. In view of the close relations between this country and the Philippines and other countries where the disease is endemic and the probable state of latency of the disease, it is of importance to physicians in this country, and especially on the Pacific coast, to be on their guard against the disorder.—*J'nal. A. M. A.*, November 4, 1916.

Intestinal Parasites.—E. J. Van Liere, Madison, Wis., has examined the stools of twenty students in the University of Wisconsin for intestinal parasites. There is no doubt but that the Oriental immigrants are a public danger in this way. An inspection in San Francisco by Glover showed that of 1,002 Chinamen examined, the majority had intestinal parasites, and of 1,484 Japanese, a somewhat less percentage were infected. These were largely of the laboring class, while the subjects at the University of Wisconsin were undoubtedly of a much higher class, and less likely to be infected. The feces of twenty male foreign students attending the University of Wisconsin were examined and ten (50 per cent) gave positive results. The infections were as follows, the figures referring to the number of the patient: (1) Hookworm and *Trichocephalus dispar;* (2) *Hymenolepis nana;* (3) *Schistosoma japonica;* (4) *Ascaris lumbricoides;* (5, 6, 7, 8, 9, 10) *Trichocephalus dispar.* The in-

fected individuals in the several instances showed disorders connected with the presence of the parasites. The details of the examination and conditions of the subjects examined indicate that 70 per cent of the twenty students showed symptoms that might be due to parasitic worms and needing medical attention. The examination shows that there is danger of infection from the average foreign student. Other persons doubtless carry parasites at times, but the percentage of infection among foreigners, and particularly Orientals, is very large.—*Ibid.*

LEUKEMIA CUTIS.—S. E. Sweitzer, Minneapolis, reports a case of leukemia cutis and discusses the literature and theories of the disease. The possibility of a leukemia cutis or aleukemic leukemia cutis is well recognized. The case reported has been aleukemic in its course so far, nothing abnormal appearing in the blood in repeated blood examinations. It is also an example of a universal type which is of interest in view of its rarity, only four cases having been reported. Arndt says that the universal form never shows tumors. Sweitzer's case showed no tumors, but did show some flat elevations on the back of the neck. The patient has been under observation since November 14, 1914, and the results of treatment have been studied microscopically. In a careful search of the literature Sweitzer finds illustrations of but two cases that resemble his; Schultz reported one and Arndt the other. Arndt's case was of the universal type. Winfield reported a case somewhat resembling this in its onset and intense itching, and normal blood findings, but the appearance of the patient was quite different, according to the photograph. The histologic picture is absolutely typical. It shows a pure lymphocytic infiltration of the skin, the type of cell being the small lymphocyte. The tendency to regard the leukemias as due to an infection seems to be growing, but no one organism seems to have been accepted by all, though a diphtheroid microbe has been reported. In regard to treatment of leukemia cutis, it would be proper to use the well-known benzol treatment if the blood picture warranted it. Sweitzer has depended in his case on Rœntgen ray, superficial and deep, but makes no prophecy as to the outcome. The latest skin sections show some lymphocytic infiltration, much less than formerly, but still present, and the mediastinal glands are still enlarged.

Burnam is working with radium applications, made over the spleen in the leukemias. The absence of radium depots puts this out of reach of the average doctor, but Sweitzer thinks it presents prospects for the future.—*Ibid,* November 18, 1916.

Diet in Beriberi.—E. B. Vedder, Washington, D. C., ends an article on the relation of diet to beriberi with the following conclusions: "As there are many conditions under which it is difficult for certain people and institutions to produce a rich and varied diet, I should like to repeat and emphasize the simple dietary rules which I have elsewhere formulated for the prevention of deficiency diseases: 1. In any institution where bread is the staple article of diet, it should be made from whole wheat flour. 2. When rice is used in any quantity, the brown undermilled, or so-called hygienic rice, should be furnished. 3. Beans, peas or other legumes, known to prevent beriberi, should be served at least once a week. Canned beans or peas should not be used. 4. Some fresh vegetables or fruit should be issued at least once a week and preferably at least twice a week. 5. Barley, a known preventive of beriberi, should be used in all soups. 6. If cornmeal is the staple of diet it should be yellow meal or water-ground meal, that is, made from the whole grain. 7. White potatoes and fresh meat, known preventives of beriberi and scurvy, should be served at least once a week, and preferably once daily. 8. The too exclusive use of canned goods must be carefully avoided. I am sure that the strict application of these rules will eradicate scurvy and beriberi, and believe that they would be equally efficacious in eradicating pellagra from the United States."—*Ibid.*

NEWS AND COMMENT.

PUBLIC HEALTH NOTES.—A recent investigation made by the United States Public Health Service in connection with studies of rural school children showed that 49.3 per cent had defective teeth, 21.1 per cent had two or more missing teeth, and only 16.9 per cent had had dental attention. Over 14 per cent never used a tooth brush, 58.2 per cent used one occasionally and only 27.4 per cent used one daily. Defective teeth reduce physical efficiency. Dirty, suppurating, snaggle-toothed mouths are responsible for many cases of heart disease, rheumatism and other chronic affections. The children are not responsible for the neglected state of their teeth. The ignorant and careless parent is to blame for this condition—a condition which hampers mental and physical growth and puts a permanent handicap on our future citizens. School teachers can and are doing much in inculcating habits of personal cleanliness on the rural school child, but this will fail of the highest accomplishment unless parents co-operate heartily and continuously. This is a duty which we owe our children.

COMBATING INSECTS AFFECTING THE HEALTH OF MAN.—Continued advances in the work of combating the activities of insects affecting the health of man are reported by the Chief of the Bureau of Entomology of the United States Department of Agriculture in his annual report, recently issued. In mosquito investigations in Louisiana a species of mosquito hitherto considered a noncarrier of malarial infection was proved to be a carrier. Studies have been made of malaria and measures are being evolved to meet plantation conditions.

The "starvation" plan, aimed to exterminate the spotted fever tick of the Bitter Root Valley, Montana, was followed during the year with encouraging success. The plan consists of the removal of the domestic hosts of the adult tick from the infested areas. The Bureau also conducted a campaign of extermination against ground squirrels and other rodent hosts of the immature ticks. Examination of the rodents killed showed 40 per cent lower infestation by the tick than during the preceding year.

The report directs attention to the demonstrations of the Bureau specialists that the breeding of flies in manure can be prevented by treating the substance with calcium cyanamid and acid phosphate, which at the same time increase the fertilizing value of the manure.

The Bureau also conducted investigations into methods of lessening fly infestation in packing establishments operated under the Meat Inspection Service of the Department.—(*Bureau of Entomology, United States Department of Agriculture.*)

LOUISIANA STATE BOARD OF MEDICAL EXAMINERS.—At the meeting of the Louisiana State Board of Medical Examiners, held in this city November 30, December 1 and 2, 1916, the following members were present: Dr. J. G. Martin, president; Dr. Leon J. Menville, Dr. Homer Dupuy and Dr. E. L. Leckert, secretary.

Eighteen physicians were present for examination, of which number sixteen were successful and were granted certificates. The certificate of one applicant, who made the required general average, was withheld pending the adjustment of certain deficiencies in his examination. One applicant failed.

The successful applicants who received certificates are: Henry Beechum Burdeshaw, Alfredo Alonso Cantu, Joseph Raymond Chisholm, Nicholas Kuntz Edrington, Clarence Bartel Erickson, James Thomas French, Upton W. Giles, Walter Ford Henderson, Lucius Walter Holloway, Oliver Leander Humble, Jr. (colored); James William Kirby, John Alexander Lanford, Edward Cabiness Melton, Alonzo Trent Palmer, Clarence Cecil Randall and Sylvain Beer Wolff.

During the session the applications of five physicians for reciprocity were favorably acted upon: William Matthew Dugan, Oswald Alfonso Eaddy, Erle Warfield Harris, Jesse R. Stamper and Presley Ewing Werlein.

On December 1 the midwifery examination was held, at which eleven applicants were present. Six were successful and received certificates: Mrs. Johanna Fruchtnicht, Mrs. Mary Grosz, Nettie J. Klingman, Mrs. Alice Perez, Maria Scullins (colored) and Elizabeth Weaver.

At the same meeting the following resolutions were adopted: "Resolved, That on and after the session of 1918-1919 no

medical school or college or institute will be considered in good standing with this Board, nor will be rated in Class 'A,' that does not require for admission at least two years of work in an approved college of arts and sciences"

"That inasmuch as several States do not demand a period of one year's practice from applicants desiring reciprocity from Louisiana, this Board waive this requirement in favor of applicants coming from these States."

The next meeting of the Board will take place in this city June 7, 8 and 9, 1917.

HYGIENE ASSOCIATION MEETING.—The annual meeting of the American Social Hygiene Association was held at St. Louis, November 20 and 21. The following officers were chosen for the ensuing year: Dr. Charles W. Eliot, president emeritus of Harvard University, and Dr. Abram W. Harris (re-elected), honorary president and president respectively. Robert S. Brookings of Washington University and Dr. Edward A. Alderman of the University of Virginia were elected vice presidents, and President David Starr Jordan of the University of California and Bishop Walter T. Sumner of Oregon, honorary vice presidents. Dr. Herman M. Biggs, New York, and Dr. William A. Evans, Chicago, were added to the Board of Directors. All other officers were re-elected.

NUMBER OF BRITISH MEDICAL STUDENTS DECLINES.—According to a statement in a recent issue of the *British Medical Journal*, the total number of medical students entering Cambridge University was 116 in 1913, 64 in 1914, 41 in 1915 and 25 in 1916.

HEADQUARTERS AMERICAN HOSPITAL ASSOCIATION.—At a meeting of this association, held in New York on November 25, it was decided to establish in Philadelphia permanent headquarters for the association, with Dr. J. H. Walsh in charge. Dr. Walsh plans to conduct a bureau of information.

NEW BREEDING PLACE FOR MOSQUITOES.—A report from the office of the United States Public Health Service at La Guayra, Venezuela, says that there had been an unusual amount of mosquitoes in the offices of the American consulate, and that after a careful search of the usual breeding places it was discovered

that they came from a water cooler of the type in which water from a large inverted bottle passes through a porcelain compartment surrounded by an ice chamber. The cleaning of the ice chamber and careful daily attention to it were followed by the total disappearance of mosquitoes from the offices.

CLOSER PROFESSIONAL RELATIONSHIP.—The *Journal* of the Michigan State Medical Society, in an editorial comment, says: "The American College of Surgeons has appointed a committee to visit South America to inspire a closer professional relationship between these two American provinces. It will undoubtedly be a junket of pleasure, hardly called for. There are pertinent problems in our own midst that should receive attention before stepping beyond our geographical boundary."

ORLEANS PARISH MEDICAL SOCIETY ELECTS OFFICERS.—At a meeting of the Orleans Parish Medical Society, held on December 9, 1916, the following officers were elected: President, Dr. Paul J. Gelpi; first, second and third vice presidents, Drs. Frank J. Chalaron, J. George Dempsey and H. E. Bernadas, respectively; secretary, Dr. Charles A. Bahn; treasurer, Dr. H. W. E. Walther; librarian, Dr. S. Chaille Jamison. Additional members of the board: Drs. W. H. Block, W. H. Knolle and J. W. Newman.

INDIAN POPULATION INCREASING.—Due to sanitary and hygienic conditions introduced among the Indians, through the personal supervision of nurses and physicians, the infant mortality among the Indians is lessening considerably. The United States Indian Service calls attention to an address by Dr. Lawrence W. White, superintendent of a Wisconsin Indian Agency, delivered at the Lake Mohonk Conference, showing that a practical educational campaign will bear excellent fruit. Appropriations for the Indians have slowly increased, from $40,000 in 1911 to $350,000 for 1917, and it is proposed to greatly increase appropriations over that figure later on. The total Indian population (1916) is placed at 209,224. Births 6,092, deaths 4,570, births over deaths 1,522.

CHEAPER RADIUM.—According to the bureau's annual report, radium worth more than a million dollars at market prices has been produced by the Federal Bureau of Mines at a cost of

$340,000. The radium was produced under an arrangement with the National Radium Institute, and most of it will go to two of the country's largest hospitals. In the same report it was announced that the bureau was instrumental in saving $20,000,000 worth of natural gas in Oklahoma by introduction of new drilling methods.

GASTRO-ENTEROLOGISTS ORGANIZE.—On November 15, 1916, the Southern Gastro-Enterological Association was organized at Atlanta and the following officers were elected: President, Dr. James C. Johnson, Atlanta; vice president, Dr. Jesse T. Rogers, Savannah, and secretary-treasurer, Dr. Marvin H. Smith, Jacksonville, Fla.

TRI-STATE ASSOCIATION MEETING.—The third annual meeting of the Tri-State Association of Tennessee, Arkansas and Mississippi was held in Memphis, November 21-23, with the election of the following officers: President, Dr. James W. Gray, Clarksdale, Miss.; vice presidents, Drs. H. Rogers Hays, North Carrollton, Miss., Richard W. Griffin, Tiptonville, Tenn., and Floyd Webb, Turrell, Ark.; secretary, Dr. James L. Andrefs, Memphis (re-elected), and treasurer, Dr. James A. Vaughan, Memphis (re-elected).

YALE'S DEPARTMENT OF HEALTH.—A department of health has been established at Yale University for the purpose of obtaining sanitary safety for the students' surroundings and furnishing them health supervision and advice. All students engaged in organized athletics, all competitors for the staff of the *Yale News,* the students working in the dining halls and all freshmen will be submitted to complete and careful medical examinations. The members of the university may consult the staff, vaccination against typhoid fever and smallpox will be provided, and students who cannot pay will be taken care of at the Yale infirmary. A permanent endowment fund of $300,000 will be needed to carry on this work, and it is expected that this sum will be raised.

DRUG ADDICTS IN NEW YORK.—According to a statement made at a public hearing held by the legislative committee investigating the drug habit evil in the State of New York, there are 200,000 persons addicted to drugs in that State.

JOURNALS CONSOLIDATE.—Beginning with the January, 1917, issue, the *Louisville Monthly Journal of Medicine and Surgery* will become the official organ of the Mississippi Valley Medical Association under the name of the *Mississippi Valley Medical Journal*. Dr. Henry Enos Tuley, secretary of the association, will continue as editor; Dr. H. Grant as business editor, and a special editorial committee, composed of the following, will assist in the editorial policy of the *Journal*: Drs. William N. Wishard, Indianapolis; Arthur R. Elliott, Chicago; Willard J. Stone, Toledo, and Louis Frank, Louisville. It is announced that a special epitome department will be established, giving each month a review of some special borderline topic which is of interest to surgeon and internist.

JESUP LECTURES.—The Jesup lectures on "Dynamic Psychology" were delivered by Robert S. Woodward, Ph.D., professor of psychology, Columbia University, New York City, under the auspices of the university and in co-operation with the American Museum of Natural History. The lectures were delivered on successive Fridays, from November 10 to December 29, inclusive.

"JUST AS GOOD" MILK.—According to a recent exchange, a so-called "milk improver" has been put on the market in London, in order to avoid the hardships resulting from the higher price of milk. It is a white powder composed of the correct combination of bone and flesh-forming constituents. A penny's worth mixed with a pint of water and added to a pint of cow's milk produce a quart of "just as good" milk.

CHOLERA STILL RAMPANT IN JAPAN.—Although since cooler weather cholera in Tokio has decreased, the disease seems to have spread in Osaka. Up to October 10 there were reported 548 cases, with 151 deaths at Tokio, while at Osaka there had been a total of 2,001 cases, with an increase of 20 daily. No foreigner, according to this report, had been attacked by the disease so far as known.

BUREAU FOR HOMELESS CHILDREN.—A Children's Home Bureau was organized in New York City on November 21, in the offices of the charities commissioner, John A. Kingsbury, the object being to find good homes with private families for de-

pendent children. Subscriptions by wealthy persons to the amount of $150,000 has backed the project. Among the subscribers are Cleveland H. Dodge, Adolph Lewisohn, V. Everitt Macy, Mrs. Helen Hartley Jenkins and Mrs. A. A. Henderson. It is planned to spend $40,000 during the coming year and the bureau guarantees that it will place 1,000 children in homes in a year. During the past month 103 children have been placed in suitable homes.

Railroad Company Awarded Prizes.—The grand prize of the American Extension of Safety and Sanitation Society for the two years 1914 and 1915 has been awarded to the Cincinnati, New Orleans and Texas and Pacific Railroad, which was constructed and is owned by the city of Cincinnati. This railroad has also been awarded the E. H. Harriman Memorial Gold Medal by the American Association of Safety, in recognition of the direct effort made for the advancement of employees, "for the conservation of human life," and "for the best record made by an American railroad in accident prevention and industrial hygiene for the public and for its own personnel during the year 1915."

Von Graefe Prize Awarded.—The German Ophthalmological Society has divided between Dr. Lindner of Vienna and Dr. Ohm of Bottrop the Von Graefe prize for the best article published in. 1911 to 1913 in the *Archiv fur Ophthalmologie* These articles were, respectively on "Miner's Nystagmus" and on "Trachoma and Inclusion Blennorrhea."

Surgeons Elect Officers.—At the annual meeting of the Southern Surgical and Gynecological Association, which was held in White Sulphur Springs, Va., December 11, 12 and 13, the following officers were elected: President, Dr. William D. Haggard, Nashville; vice presidents, Drs. J. Ernest Stokes, Salisbury, N. C., and Francis R. Hagner, Washington; secretary, Dr. Herbert A. Royster, Raleigh, N. C.; treasurer, Dr. Legrand Guerry, Columbia, S. C., and member of the council, Dr. Thomas S. Cullen, Baltimore. The 1917 convention will be held in St. Augustine, Fla.

The American Congress on Internal Medicine held its first scientific session on December 28 and 29, 1916, at the Hotel

Astor in New York City, with the president, Dr. Reynold Webb Wilcox, in the chair. The meeting of the Council of the American College of Physicians formed one of the principal features of the convention. The principal subjects of discussion at the meeting were "The Ductless Glands in Cardio-Vascular Diseases and Dementia Precox" and symposion on "Duodenal Ulcer."

ST. JOHN-ST. CHARLES BI-PARISH MEDICAL SOCIETY MEETING.—At the annual meeting of the St. John-St. Charles Bi-Parish Medical Society, held at Reserve, La., December 6, the following officers were elected: President, Dr. J. P. Elmore, Edgard; vice president, Dr. L. T. Donaldson, Sr., Reserve; secretary-treasurer, L. Cheves Tebo, Reserve; delegate and alternate, Drs. S. Montegut, Laplace, and R. H. Johnson, Moberly, respectively.

THE EAST FELICIANA PARISH MEDICAL SOCIETY met at Clinton, La., December 7, and elected the following officers: President, Dr. F. M. Thompson, Slaughter; vice president, Dr. T. W. Evans, Jackson; secretary-treasurer, Dr. E. M. Toler, Clinton. Delegate and alternate, respectively, Drs. T. W. Evans and J. W. Lea.

EDWARD L. TRUDEAU FOUNDATION.—As a memorial to the late Dr. Edward L. Trudeau an endowment fund has been created to perpetuate his name and to continue the scientific investigations that were a life-long interest of the American pioneer in tuberculosis research. The income is to be devoted "to maintain laboratories and carry on research into the nature, causes and treatment of tuberculosis; to maintain regular courses of instruction for physicians and others in the most advanced knowledge of the above subject, under the name of the Trudeau School of Tuberculosis; to offer young physicians the opportunity to engage in research work, while undergoing treatment for the disease, through the establishment of Fellowships."

The second session of the Trudeau School of Tuberculosis will be held at Saranac Lake from January 3 to February 10, 1917. Further information can be had by addressing the secretary, Trudeau School, Saranac Lake, N. Y.

PERSONALS.—George Edgar Vincent, Ph.D., LL.D., president of the University of Minnesota and formerly dean of the facul-

ties of arts, literature and science of the University of Chicago, will succeed Mr. John D. Rockefeller, Jr., as president of the Rockefeller Foundation, this to take effect on May 15, 1917. Mr. Rockefeller has resigned to become chairman of the Board of Trustees, in order that he may give his entire time to the work.

Dr. Alexander C. Magruder, the new president of the Colorado State Medical Society, is a Tulane graduate, having received his degree in medicine from that university in 1900.

Dr. R. M. Sterrett has resigned as advertising manager of the Denver Chemical Manufacturing Company, effective January 1.

Dr. J. G. Martin of Lake Charles, president of the State Board of Medical Examiners, was a visitor in New Orleans during the month in connection with the examination of applicants before the board.

Dr. Joseph A. Danna is away visiting clinics in the North.

Among the doctors of New Orleans who attended the meeting of the Southern Surgical and Gynecological Association at White Sulphur Springs were Drs. S. M. D. Clark and J. A. Danna.

REMOVALS.—Dr. Allen Orton, from Addison to Pratt City, Ala.

Dr. C. C. Thompson, from Pioneer to Oak Grove, La.

Dr. Jerome M. Triolo, from El Paso, Tex., to La Mesa, N. M.

Dr. C. L. Morris, from South Greenfield to charge of Kansas City General Hospital, Kansas City, Mo.

Dr. W. R. Clement, from Jennings to 524 South Boulder street, Tulsa, Okla.

Dr. S. E. Thompson, from Carlsbad to San Angelo, Tex.

MARRIED.—On November 30, 1916, Dr. J. C. Cole, of this city, to Miss Betty Courtland, of Chicago.

BOOK REVIEWS AND NOTICES

All new publications sent to the JOURNAL will be appreciated and will invariably be promptly acknowledged under the heading of "Publications Received." While it will be the aim of the JOURNAL to review as many of the works accepted as possible, the editors will be guided by the space available and the merit of respective publications. The acceptance of a book implies no obligation to review.

Applied Immunology, by B. A. Thomas, A. M. M. D., and R. H. Ivy, M. D., D. D. S. J. B. Lippincott Company, Philadelphia and London.

This work will fill a decided place in modern medical literature. Not only is it valuable for the review of the subject in all of its phases, including the history of immunology, but it is encyclopedic in the information furnished. The terms current in medical journals dealing with advanced bacteriology are made very clear, and detail of technic is afforded to develop an understanding of the terms employed. The methods of the preparation and of the use of sera, vaccins and many tests are comprehensively presented. Besides, several chapters are appended dealing with kindred topics. Altogether an excellent text and a valuable work of reference.

Dyer.

The Physician's Visiting List. P. Blakison's Son & Co., Philadelphia.

This generally and favorably known little publication comes in its usual form for 1917, its sixty-sixth year. It contains some forty pages of references in addition to the blank pages for recording visits, engagements, etc.

The Practitioner's Visiting List. Lea and Febiger, Philadelphia and New York.

A convenient record book for the practitioner, including a number of useful reference tables, all neatly arranged and presented in several styles for varying numbers of patients per week or month.

The Medical Record Visiting List. Wm. Wood & Co., New York.

Again, for 1917, this list or diary is offered to the profession, with thirty-odd pages of information besides the recording pages themselves. The little book has been newly revised and is quite presentable and useful.

PUBLICATIONS RECEIVED

W. B. SAUNDERS COMPANY. Philadelphia and London, 1916.

The Medical Clinics of Chicago. November, 1916. Volume 2, Number 3.

Blood Pressure, by Francis Ashley Faught, M.D. Second edition, thoroughly revised.

Constipation, Obstipation and Intestinal Stasis, by Samuel Goodwin Gant, M. D., LL.D.

The Operating Room, by Amy Armour Smith, R. N.

Personal Health, by William Brady, M. D.

LEA & FEBIGER. Philadelphia and New York, 1916.

The Practitioner's Visiting List for 1917.

Syphilis, by Loyd Thompson, Ph.B., M. D.

P. BLAKISTON'S SON & CO. Philadelphia, 1916.

Practical Bacteriology, Blood Work and Animal Parisitology, by E. R. Stitt, A. B., Ph. G., M. D.

The Physician's Visiting List for 1917.

THE MACMILLAN COMPANY. New York, 1916.

The Pathology and Differential Diagnosis of Infectious Diseases of Animals, by Veranus Alva Moore, B. S., M. D., V. M. D. Fourth edition, revised and enlarged.

WILLIAM WOOD & COMPANY... New York, 1916.

A Practical Medical Dictionary, by Thomas Lathrop Stedman, A. M., M. D.

A Text-Book of Histology, by Frederick R. Bailey, A. M., M. D. Fifth revised edition.

The Practice of Urology, by Charles H. Chetwood, M. D., LL. D., F. A. C. S. Second edition.

PAUL B. HOEBER... New York, 1916.

The Mentally Defective Child, by Meredith Young, M. D., D. P. H., D. S. Sc.

The Healthy Marriage, by G. T. Wrench, M. D., B. S.

The Sexual Disabilities of Man and Their Treatment and Prevention, by Arthur Cooper. Third edition, revised and enlarged.

WASHINGTON GOVERNMENT PRINTING OFFICE. Washington, D. C., 1916.

Public Health Reports. Volume 31, Numbers, 45, 46, 47 and 48.

Annual Report of the Secretary of the Navy. For the Fiscal Year 1916.

Report of the Department of Health of the Panama Canal. August and September, 1916.

Index Catalog of the Library of the Surgeon-General's Office, U. S. Army. Second series, vol. xxi.

MISCELLANEOUS:

Report of the Philippine Health Service. From January 1, to December 31, 1915. (Manila Bureau of Printing, 1916).

Annual Report of the Sanitary Commissioner With the Government of India for 1914. (Government Printing Office, Calcutta, India, 1916).

Report on Sanitary Measures in India in 1914-1915. Vol. XLVIII. (His Majesty's Stationery Office, London, England).

Special Bulletin. Prepared by the Division of Industrial Hygiene, State of New York. No. 79: **Anthrax.**

Monthly Bulletin Louisiana State Board of Health. New Orleans, November, 1916.

The Bulletin of the Department of Public Charities. (Municipal Bldg., N. Y. City).

International Health Commission. Effects of Hookworm Disease on the Mental and Physical Development of Children, by Edward K. Strong, Jr., Ph. D. (The Rockefeller Foundation, N. Y., 1916).

REPRINTS

Dissemination of Bacteria in the Blood, by A. J. Hinkelmann.

Urinary Lithiasis, by Victor Cox Pedersen, A. M., M. D., F. A. C. S.

MORTUARY REPORT OF NEW ORLEANS.

Computed from the Monthly Report of the Board of Health of the City of New Orleans, for November, 1916.

Cause.	White	Colored	Total
Typhoid Fever	8	4	12
Intermittent Fever (Malarial Cachexia)	2	1	3
Smallpox	.....	.....	....
Measles	1	.....	1
Scarlet Fever	.....	.....	....
Whooping Cough	.....	.....	....
Diphtheria and Croup	3	1	4
Influenza	5	.....	5
Cholera Nostras	.....	.....	....
Pyemia and Septicemia	.....	.....	....
Tuberculosis	35	50	85
Cancer	20	12	32
Rheumatism and Gout	2	1	3
Diabetes	9	1	10
Alcoholism	1	.....	1
Encephalitis and Meningitis	1	.....	1
Locomotor Ataxia	.....	.....	....
Congestion, Hemorrhage and Softening of Brain	24	14	38
Paralysis	2	2	4
Convulsions of Infancy	.....	.....	....
Other Diseases of Infancy	10	7	17
Tetanus	1	2	3
Other Nervous Diseases	2	1	3
Heart Diseases	64	36	100
Bronchitis	2	2	4
Pneumonia and Broncho-Pneumonia	22	25	47
Other Respiratory Diseases	2	.....	2
Ulcer of Stomach	1	.....	12
Other Diseases of the Stomach	5	.....	5
Diarrhea, Dysentery and Enteritis	13	14	27
Hernia, Intestinal Obstruction	4	2	6
Cirrhosis of Liver	5	4	9
Other Diseases of the Liver	2	.....	2
Simple Peritonitis	.....	.....	....
Appendicitis	4	4	8
Bright's Disease	20	16	36
Other Genito-Urinary Diseases	11	12	23
Puerperal Diseases	2	2	4
Senile Debility	6	.....	6
Suicide	3	3	6
Injuries	10	22	32
All Other Causes	27	9	36
Total	329	247	576

Still-born Children—White, 15; colored, 33; total, 48.

Population of City (estimated)—White, 276,000; colored, 102,000; total, 378,000.

Death Rate per 1000 per annum for Month—White, 14.30; colored, 29,06; total, 18.28. Non-residents, 15.78.

METEOROLOGIC SUMMARY. (U. S. Weather Bureau.)

Mean atmospheric pressure 30.16
Mean temperature ..... 63.
Total precipitation ..... 0.88 inches
Prevailing direction of wind, southeast.